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Prenatal and Postnatal Nutrition and Lactation Consulting: A Feasibility Study.

Marissa Blake Beale
East Tennessee State University

Prenatal and Postnatal Nutrition and Lactation Consulting:

A Feasibility Study

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by

Marissa Blake Beale

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Jamie Branam Kridler, PhD, Chair

Elizabeth Lowe MS, RD

Kelly Blake Price, PhD

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ABSTRACT

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The purpose of this study was to evaluate the feasibility of a prenatal and postnatal nutrition and lactation consulting facility in either of two locations in the Tidewater region of Virginia, Virginia Beach or Williamsburg. Experts in nutrition and lactation, a registered dietitian and licensed lactation consultant, would be the ideal means of providing adequate nutritional and lactation advice for the mother and infant to foster healthy, optimal pregnancy outcomes and lactation success. A web-based search for adequate data on the demographic sketches of the two cities was done to develop an understanding of meeting the needs of the target population for this type of facility. Women of higher socioeconomic status, higher education level, and with emotional support from spouse/family were targeted. This study will act as the initial step in conducting further research in development of a business plan for a potential facility.

DEDICATION

I would like to dedicate this manuscript to my loving family and fiancé, Chris Spady. Without their love and support in times of discouragement, I do not know that I would have been able to pull through. They have been my cheerleaders over the past two years as I have worked towards my goals of becoming a Registered Dietitian and completing my Masters degree. For all of the phone calls of encouragement and visits on the weekends, I thank you and dedicate my thesis in your honor.

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Another person who has been influential during my time here at East Tennessee State University is Beth Lowe, our program director and a thesis committee member. She has been a plethora of advice and encouragement throughout graduate school and I could not have done it without her. She always said I would be the one going into management and through this thesis hopefully someday that is where I am headed with my career.

As just mentioned, management may become a major part of my life and I would like to thank Dr. Kelly Price as well for her expertise in business management and marketing. She has guided me in the right direction as far as where this potential business may go and how to get started on a business plan.

My fellow classmates have also been a great support during my time in Tennessee and they deserve much credit for my sanity over the past two years.

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CHAPTER 1

INTRODUCTION

Background

There has been much research to determine the effects of maternal weight gain during pregnancy and the effects it has on infant birth weight. The Institute of Medicine has developed standard weight gain recommendations dependent on the mothers' pre-pregnancy body mass index (BMI) (See Appendix A) (1). One of the objectives of Healthy People 2010, developed by the United States Department of Health and Human Services, was to have an increased number of women reach these recommended weight gains during their pregnancy (2). This would be linked to the objective of decreasing the incidence of low birth weight (LBW) infants to less than 5.0% and very low birth weight (VLBW) to less than 0.9% by the year 2010 (2). Trouba noted that when an effective nutrition program was in place, the weight gains of the mothers were more reflective of those recommended during pregnancy, thus decreasing the number of low birth weight infants and resulting in better overall outcomes of pregnancy (3).

As the nutrition expert, the registered dietitian has the ability to guide pregnant women in the right direction as far as the appropriate weight gain range and helping women understand the importance of diet as it can affect the outcome of pregnancy, ultimately the infant. Fowles reported that inadequate nutritional intake can result in low birth weight infants, whereas excessive nutritional intake can result in infants who are large for gestational age as well as health problems such as gestational diabetes, high blood pressure, and post-partum weight retention for the mother (4). Therefore, what the mother does during pregnancy affects the infant's health and birthing outcomes (4). Pregnancy is a time in a woman's life when she is most likely to come in contact with healthcare professionals on a regular basis; therefore, it is an

opportune time for nutritional counseling from registered dietitians, who are trained professionals, to change behaviors and beliefs about diet and nutritional intake (4).

There has also been a great deal of research to determine the benefits of breastfeeding for not only the infant but the mother as well. The Healthy People 2010 recommendations for the United States are to have 75% of mothers breastfeeding six weeks after delivery of the baby, 50% breastfeeding at six months after delivery, and up to 25% breastfeeding up to a year after delivery (2). Although there are noted barriers and influences that may discourage women from breastfeeding, with the guidance and knowledge of certified lactation consultants, some of these obstacles may be overcome.

In looking at two cities in the Tidewater region of Virginia, Virginia Beach and Williamsburg, a feasibility study was conducted to determine if and in which city a privately owned and operated prenatal and postnatal nutrition and lactation consulting service may be beneficial and held in high regards by the community, healthcare field, and families.

Fortunately for those who qualify based on low income standards, the U.S. Department of Agriculture makes available nutrition and lactation specialists to pregnant and lactating women by way of local health departments and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) (5). However, in the interest of this study the women who may take advantage of a private facility offering prenatal and lactation services are those who would not qualify for WIC. These women would be knowledgeable of the importance of nutrition during pregnancy and motivated to provide the infant with the best nutrition after birth. The economics and benefits of having a registered dietitian who is also a certified lactation consultant to be the expert in the field of prenatal and postnatal nutrition and lactation were explored to determine the practical implications of such a facility and its service to the community.

Statement of the Problem

The purpose of this study was to investigate the efficacy of prenatal and postnatal nutrition and lactation consulting services by health professionals to determine their place and effectiveness in the private outpatient setting and to determine the feasibility of providing these services.

Significance of the Problem

By having such services available to pregnant and postpartum women, the region as a whole would be moving toward achieving the goals established by the U.S. Department of Health and Human Services as stated in Healthy People 2010 to have 90% of pregnant women receiving early and adequate prenatal care and increased breastfeeding rates (2).

Question to be Addressed

Would such a prenatal and postnatal nutrition and lactation consulting service be feasible if undertaken by a registered dietitian with a license for lactation consulting in either Virginia Beach or Williamsburg, Virginia?

Mission Statement of Potential Facility

The overall objective of the prenatal nutrition and lactation consulting facility is to promote the benefits of good nutrition and breastfeeding through comprehensive education and counseling before, during, and after pregnancy to achieve optimal outcomes for both the mother and the infant.

Assumptions

Assumptions of this study include:

1. It was assumed that the demographics of these cities will continue in these current trends of birth rates, population, income, educational levels, etc. so that a projection could be made for the future.
2. It was assumed that no other companies like this will be opening between the time of this study and the time of implementation.
3. It was assumed that this was the first step in completing a business plan.
4. It was assumed that this study was the basis for further initiatives to be taken for such a business plan.

Limitations

1. This study was limited to the most recent data being seven years ago in the U.S. Census Bureau of 2000.
2. This study was limited by the researcher not being a full-time resident in the Tidewater region of Virginia in the past six years.

Definition of Terms

Body Mass Index (BMI) – Weight (in kilograms) divided by height (in centimeters) squared. A normal value is 18.5-24.9. A value of 25 or greater indicates a risk for body weight-related health disorders. One BMI unit equals 6-7 pounds (6).

Consulting – Employed or involved in giving professional advice to the public or to those practicing the profession (7).

Gestational Diabetes – Elevated blood glucose that develops during pregnancy and returns to normal after birth; one cause is placental production of hormones that interfere with the regulation of blood glucose by insulin (6).

Certified Lactation Consultant (LC) – A health care provider who possesses the necessary skills, knowledge, and attitudes to provide substantive breastfeeding assistance and skilled technical management of lactation-related problems (8)

Large for Gestational Age (LGA) – Referring to any infant having a birth weight greater than the 90^{th} percentile (9).

Low Birth Weight (LBW) – Referring to any infant weighing less than 2500 grams at birth; most commonly results from preterm birth (6).

Registered Dietitian (RD) – A person who has completed a baccalaureate degree program approved by the American Dietetic Association, performed at least 900 hours of supervised profession practice, and passed the registration examination for dietitians (6)

Very Low Birth Weight (VLBW) – Referring to any infant weighing less than 1500 grams at birth (9)

CHAPTER 2

LITERATURE REVIEW

Prenatal Nutrition Counseling: Pregnancy Outcomes

In 1985 research was conducted by Orstead to determine whether in-depth nutrition counseling by nutrition professionals produced better maternal weight gains and infant birth weights (10). The retrospective study examined 86 women who attended only one outpatient nutrition class during pregnancy versus 114 women who met for several sessions with a registered dietitian to review appropriate nutrition and weight gain during pregnancy (10). It was determined that the women in the group who experienced more intense nutritional guidance gained 2.5 kilograms more weight than the women in the group with only one prenatal nutrition session (10). The more the women were exposed to nutritional guidance and advice, the better the correlation of maternal weight gain in the appropriate range and infant birth weight (10). Another relationship detected in this study was that the earlier or more frequent a woman was exposed to nutritional counseling, the more weight was gained as a result (10).

Another study determined it was the timing of maternal weight gain that had the biggest influence on fetal growth and birth weight as well as the mother's post-partum weight retention (11). In this study 371 women were followed throughout pregnancy to monitor weight gain in the first, second, and third trimesters (11). The results indicated that a sizeable weight gain during the first half of pregnancy more often resulted in large for gestational age infants and women who gained the majority of the weight later in the pregnancy were less likely to experience weight retention after delivery (11). There is a minimum amount of fetal growth before the 20^{th} week of pregnancy, and, therefore, a small amount a weight gain has been recommended at this time (11). The allocation of weight gain as determined by this study

recommends “3-4kg from weeks 0-20, and 4-5kg for weeks 21-30 and >31 weeks,” which similar to the Institute of Medicine’s recommendations, should reassure adequate weight gain and lower the risk of post-partum weight retention (11).

Similarly, in another study by Scholl, it was determined that the rate of weight gain during pregnancy affected the infant weight, pregnancy outcome, and the amount of weight the mother retained due to pregnancy (12). All of the 274 women in the study were within a normal, healthy weight range and were monitored from the beginning of the second trimester until week 36 (12). The excessive rate of weight gain greater than 0.68kg per week was associated with the mother being overweight after delivery, yet no significant improvement of the infant’s weight or growth occurred (12).

It was found in a study by Derbyshire, that women who have a higher body mass index (BMI) before pregnancy were more likely to be at nutritional risk due to their inability to accurately portray their eating patterns during pregnancy (13). It was noted that women who were overweight or obese during pregnancy were more likely to try to lose weight throughout pregnancy (13). The dietary intakes of 67 women were analyzed to determine their nutritional adequacy over a week during the first trimester of the pregnancy (13). In looking at how to improve the dietary intake of these women, nutrition experts or dietitians may need to educate and monitor the weight gain of these women to prevent inadequate intake during this important time and need for nutrients, especially fiber, iron, and folic acid (13).

Role of the Registered Dietitian

The effectiveness of a registered dietitian was observed in a study based in Kentucky on patients with chronic diseases (14). Three months after only one nutrition counseling session with a dietitian, this study determined that patients who had met with a dietitian had much better

health outcomes and were closer to their goals than those who had not met with the dietitian as reflected through blood tests within normal limits and improved weight management (14). Although this study examined only people with type 2 diabetes and patients with cardiovascular disease, it illustrated the impact that a registered dietitian can have on the overall health of an individual, including during pregnancy, a critical time when women realize the need for healthcare and guidance for their child.

The effectiveness of the registered dietitian in counseling mothers with gestational diabetes mellitus (GDM) has been studied as well. Reader et al. conducted a study to determine the effects of specialized GDM care via a RD versus regular diabetes clinics; there was better diabetes management in the women with GDM who received care from the RD (15). Because GDM is an entity of its own, nutrition education for this population of pregnant women requires specialized care from a RD who has experience in this disease. The American Diabetes Association has recognized the importance of nutrition counseling and recommends that all women diagnosed with GDM be educated and followed by a registered dietitian to control blood glucose (16).

In relation to the effectiveness of the dietitian in the prenatal setting, a review by Trouba established that prenatal nutrition counseling sessions were most effective when started early in the pregnancy (3). Trouba also outlined the main goals and objectives of the dietitian during the meetings with the mother, specifically nutritional assessment and health status, monitoring weight gain and dietary intake, and setting realistic goals for each patient (3).

In 2002 Fowles attempted to gain an understanding of the level of nutritional knowledge of 109 pregnant women. It was determined that dietitians were much better at getting an accurate portrayal of a woman's food and fluid intake than the physician due to the dietitian's

specific skills and training (17). The research concluded that women who were underweight beginning gestation gained less than recommended weight during pregnancy and obese women gained more weight than recommended (17). Fowles's research also suggested that individualized nutrition counseling during pregnancy assisted the mother in making better food choices that would in turn provide the correct amounts of nutrients for the mother and the fetus (17). These nutrition sessions would not only be beneficial during pregnancy but allow for deeper understanding of healthy eating behaviors throughout life (17).

Group Versus Individual Nutrition Counseling Sessions

In a study by Ickovics, which was based on the idea that social support from others at the same stage in life, in this case pregnancy, examined the hypothesis that the group prenatal counseling sessions would be more effective than the one-on-one counseling (18). As many as 12 pregnant women met as a group and received counseling on the basics of pregnancy, the birthing process, and what to expect as parents (18). This study looked at 458 women, half of whom participated in group sessions and the other half had one-on-one educational nutrition care (18). These sessions covered a wide range of topics from prenatal nutrition and infant feeding to mother and infant care following birth (18). The effectiveness of the intervention was determined by the infant weight at birth, which indicated that mothers who had the group counseling sessions had fewer incidences of infants with low birth weight (18). This study may provide insight to the healthcare field about the emotional and physical support provided by group settings to have improved health outcomes (18).

Barriers and Influences on Prenatal Nutrition

Group or individual settings with a dietitian have barriers that prevent women from getting adequate prenatal nutrition that can hinder the maternal weight gain as evidenced in a

study by Tuffery in 2005. This study examined the reasons why poor nutritional intake was experienced by women in the first trimester, third trimester, and six months post-partum (19). During the first trimester, it was indicated that physical reasons prevented the majority of women from reaching adequate nutrient intake, specifically nausea, food cravings, and constipation (19). However, during the third trimester, heartburn or indigestion was the primary physical restraint to adequate nutrition as well as emotional stressors due to their current situations (19). Based on this research, a dietitian should focus on these factors affecting nutritional status and develop individualized goals to lessen their effects.

In another study by Fowles in 2004, there was evidence that economic status had a huge impact on nutritional knowledge and well-being for the mother and infant (4). Without adequate funds to eat the appropriate foods that are nutrient dense there can be an increased risk of low birth weight infants (4). Foods that are high in fat, calories, and sodium without the needed vitamins and minerals can result in nutritional deficiencies in the lower income families who cannot afford better quality foods (4).

With some of the barriers during the first and third trimester already mentioned, it was important to take a look at the psychosocial effects on prenatal nutrition. In a 2005 study by Hurley, 134 pregnant women participated in the study to determine if stress, fatigue, and anxiety during pregnancy were linked to an over-consumption of the macronutrients in the diet. However, in some cases lower intakes of micronutrients resulted in unbalanced diet and inadequate intake (20).

In a three-part series of evaluation, Orr studied the “patient’s view on nutritional care in pregnancy.” Orr in part III of his study on patient perspectives discovered that women who had already had one child did not feel the need for nutritional advice for their consecutive

pregnancies (21). Orr also reported in this article that nutritional knowledge was higher among women who had more education and were from higher socioeconomic status (21).

Standard Prenatal Nutrition Education

Fowles determined that prenatal women received very little knowledge and information on nutritional advice from their obstetricians (17). Although standard nutritional counseling was adequate for most of the pregnant population, situations and conditions arose that required the experience of a dietitian for guidance of chronic conditions to minimize complications during pregnancy, such as preeclampsia and gestational diabetes (4).

In part one of the studies by Orr, it was determined that only 19% of 894 prenatal women who were interviewed received any nutrition education or recommendations from their physician (22). It was assumed that because physicians know nutrition is often handled at public prenatal care classes, very little was reviewed during prenatal doctor visits (22). However, if women were unaware of these classes or unable to attend, they would proceed through pregnancy with little nutritional advice or guidance.

Lactation Consulting by a Licensed Lactation Consultant

The International Board of Lactation Consultants was established in 1985 to set a professional standard for all those who profess to be knowledgeable about the mechanics and physiology of breastfeeding (23). These specialists have been identified by their peers in the medical field as promoting breastfeeding and providing knowledge and care to new mothers and their infants (23).

A randomized, controlled study was conducted to determine if prenatal and postnatal lactation consulting was effective in extending the period of breastfeeding of infants (24). Before receiving any care or education, the subjects were asked to fill out a survey to determine

their intentions and apprehensions about breastfeeding (24). A group of 145 pregnant women were seen by a lactation consultant for two prenatal sessions, made a visit in the hospital after delivery, and were followed up by home visits and phone calls as needed (24). The breastfeeding initiation and duration of these women were compared to 159 women who received no extensive breastfeeding education (24). The results revealed that the experimental program was more successful at 20 weeks postpartum, having 53% of women still breastfeeding while only 39.3% of the control group were still breastfeeding (24).

Another study by Porteous et al. concluded that education and support from specialized healthcare professionals was effective in extending the duration of breastfeeding, especially after delivery (25). In the study, 26 women received personal, 24-hour access to a midwife and 25 women received standard prenatal care provided by a nurse within the hospital (25). It was determined that four weeks after delivery, 100% of the women receiving the in-depth care from the midwife were still breastfeeding whereas, only 68% of the control group continued to breastfeed (25). There was almost 30% higher breastfeeding duration with the specialized care and support from the midwife than the standard prenatal care (25).

Health Benefits of Breastfeeding

The benefits and results of breastfeeding have been shown for many years and are advocated by the board-certified lactation consultants (26). One of the key points the lactation consultants have bestowed upon their pregnant clients is the protection provided through breast milk through strengthening of the infant's immune response (26). Children who were breastfed have lower morbidity and mortality rates as well as improved cognitive performance in comparison to bottle-fed counterparts (26). Mothers who choose to breastfeed experience not only bonding with their young child, but they received benefits as well such as better recovery

after delivery and they were less likely to experience post-partum weight retention since a large number of calories are burned while breastfeeding (26).

Breastfeeding Initiation

A review of lactation practices by Wambach et al. discussed the feedback of the effectiveness on feeding practices; it concluded that prenatal education sessions increased breastfeeding initiation (26). Once mothers leave the hospital, the breastfeeding period was extended as they had more contact with lactation consultants or health professionals who answered questions about problems that arose with lactation (26).

Hill et al. concluded that the earlier women were introduced to the mechanics and evidence-based research about breastfeeding, the more receptive they were to the idea of breastfeeding (27). The author cited the importance of lactation consultants and knowledgeable nurses during the first week post-partum in helping with the initiation of the breastfeeding (27). This article indicated that the initiation of breastfeeding was related to the mother's behavioral intent, meaning that encouragement was appreciated, but that the mother already had an idea that she might like to try breastfeeding (27).

Influences and Barriers to Breastfeeding

Some of the most often mentioned influences of whether or not to breastfeed continued to be linked with social status. In California between 1999 and 2001, 10,519 pregnant women were asked to fill out a survey about their socioeconomic status (28). The outcome of this analysis was consistent with previous studies finding that women of higher socioeconomic status, higher educational levels, and those who were older and married were more likely to breastfeed than their counterparts (28).

Of women who chose to breastfeed, Wambach mentioned that some of the most common problems mothers encounter that discouraged the continuation of the feeding were physical barriers such as "sore nipples, engorgement, mastitis, and perceived or actual insufficient milk supply (26)." Mothers also found it discouraging to breastfeed as it was difficult to find help or answers to their questions about techniques especially when the doctors and nurses were uneducated on the specifics of breastfeeding (26).

Influences of whether or not to breastfeed were classified into two categories, primary and secondary, in the study by Hill et al. (27). The primary factors were "prior lactation experience, intent to breastfeed, living with the baby's father, maternal education and income, weeks of gestation, and ethnicity;" the secondary factors were "time of initiation of breast stimulation, early frequency of breast stimulation, and early milk output" (27). The primary indicators of infant feeding method determined in the research by Hill depended slightly on the timing of birth, preterm or full-term (27). Income level was concluded to be the main influence on infant feeding method, with higher income households resulting in a higher chance of breastfeeding (27).

A similar longitudinal study by Mathews was conducted to determine the factors that influenced women one way or another on the route of nutrition for their infants, breastfeeding or bottle-feeding (29). A total of 778 women were followed during pregnancy until six months postpartum. Of this sample, 41.7% of the women began breastfeeding in the hospital, 1.2% did a combination of breast and bottle-feeding, and the remainder 57.1% chose to solely bottle-feed (29). Significant results indicated that there was a correlation between mothers being older, better educated, and of higher socioeconomic status and breastfeeding (29). In questioning the women as to who or what influenced their decision to breastfeed, their husband or partner was

the most influential followed by the maternal grandmother and friends (29). Health professionals appeared to have little effect on this decision on how to feed the infant. However, it appeared that women who were first-time mothers were much more apt to listen to what the health professionals had to say (29). Based on this research, the authors concluded that mothers have two specific times in their pregnancy that are critical for these decisions, one before the birth of their first child and the other time being the first few weeks post-partum (29). It appeared that nutrition and feeding method information for the infant's best interest needed to involve not only the mother, but her support group/family as well (29).

As found in the previous article, fathers or the male involved in the decision to breastfeed or bottle-feed after the baby was born had a definite influence on the final decision. This study looked at the effectiveness of educating fathers about the advantages of breastfeeding to have them serve as support and encouragement in the initiation of breastfeeding (30). In this study, 59 fathers were randomly separated into two groups, one received breastfeeding promotion course and the other group received only information about infant care (30). The results showed that 71% of the women whose partner had attended the breastfeeding education course ended up breastfeeding their baby versus only 41% of women whose partners did not receive the education about breastfeeding (30). These results showed the strong influence that the father or partner had on the decision of how to feed the baby; it could be hypothesized that if the pregnant women attended with their partners the effectiveness of this intervention could be further increased (30).

Physicians and Their Roles and Expectations

Allard discussed the lack of "knowledge and time that physicians have to provide nutrition education on a one-on-one basis (31)." To overcome this problem, an obstetrician in Rhode Island in conjunction with a nurse-midwife and registered dietitian, started their own

solution to providing parents with adequate knowledge on maternal nutrition and motivating the family members to all be involved in healthy eating habits (31). Allard pointed out that the first trimester was the best time to introduce nutrition information because parents were more likely to be excited and anxious to do what is best for them and the fetus (31). The obstetrician who helped initiate the classes had more time to focus on the health of the mother and baby as all of the nutrition and behavioral information was covered in the classes by experts in that field (31).

The expectation of what the physician desired from a dietetics professional in the prenatal field was explored to determine where the RD could be the most effective (32). In this article, the Quality Service Management (QSM) model was sent to 352 members of the obstetrics and gynecology society to identify the characteristics physicians desire to see from the dietitians they were working with (32). Based on the 130 surveys that were completed, it was concluded that physicians expect dietetics professionals to show "competence in prenatal nutrition" and that they were timely in "getting results" back to the physician (32). Physicians also view "effective communication, follow-up and documentation, and availability" in high regards when deciding whether or not to associate with a dietitian (32). The physicians who responded, reported making only 2-3 referrals to dietitians per month, and 12% indicated they didn't make referrals at all (32). The reasoning behind no referrals was "they or their staff provided nutrition care, reimbursement was inadequate, specialized nutrition care was not needed or was perceived to be of questionable impact (32)." However, it appeared that of the physicians who used the services of a dietitian, "74.6% of the dietitians work exclusively with the physician's practice (32)." Through this research, it was possible for a dietitian to get a better understanding of the needs and expectations physicians in the prenatal field desired to see when working with a nutrition

professional and what the dietitian could do to improve their chances of providing their expertise.

When it came to breastfeeding education, physicians often were not up to date and knowledgeable about the best practices for mother and infant as indicated by a study that surveyed physicians about breastfeeding knowledge (33). Of the 262 physicians who participated in the study, 51% reported having little to no education on breastfeeding counseling and only 9% felt the education they had received was adequate (33). Based on the survey, it was determined that 42% of the physicians were unaware that HIV could be transmitted through breast milk and there was mixed response to exercise affecting lactation (33). Almost half of the physicians (44%) indicated that their method of informing mothers about breastfeeding was through pamphlets, referral to lactation consultants, or a personal counseling session (33). Based on the findings of this study, it was concluded that dietetics as a profession needs to be more proactive in spreading knowledge and awareness of breastfeeding as nutrition professionals in conjunction with the prenatal and postnatal care of mothers and infants (33).

Stakeholders

To gain an understanding of a prenatal and postnatal high risk pregnancy intervention program, the Prince Edward Island program was established in 1971. Its effectiveness and satisfaction among those involved was studied by MacLellan et al. to determine the strengths and weaknesses of the program (34). One of the greatest benefits for the women who participated in the study was the social support from healthcare professionals and their peers (34). The majority of those involved in the program, nutritionists 100%, clients 94%, and the referring health professional 58% indicated extreme satisfaction with the program (34). The one-on-one contact between the nutritionist and the clients either at the office or at the client's home was one of the

program's greatest strengths (34). The nutritionists reported satisfaction based upon being able to help mothers in need and feeling like what they were doing was worthwhile; this provides great job satisfaction and results in job retention (34). Some of the limitations in this facility/service were "inadequate staff and/or time, administrative requirements, limited communication and program awareness, and difficulty contacting clients (34)." The recommendations based upon this satisfaction survey indicated that better communication between the healthcare team and client were very critical, counseling approaches needed to be more individualized, additionally job descriptions, program policies, and expectations should be clearly established, and standards must be clearly delineated to prevent confusion and poor job satisfaction by staff (34). Based on this study, there were many areas to improve upon due to problems encountered in initiating a prenatal and postnatal nutrition and lactation consulting service for high-risk clients, as well as other women interested in improving the outcomes of pregnancy and the health of their infant.

In developing a prenatal and postnatal nutrition and lactation consulting program there were organizational and developmental strategies to follow in creating a framework for a system/method that would be effective and efficient (35). Issel discussed the organizational and programmatic capacities of developing a program where there were adequate resources to sustain and maintain the program. This would allow it to evolve with the ever-changing environment to meet the needs and demands of the clientele (35). As well as organization, funding became an important consideration as Issel concluded that the "greater the diversity of funding, the less dependent the program is on any single source" which could ease the financial and physical stress of the stakeholders (35). Issel emphasized that in the situation of case managers, the theory could be applied to other professions; less time spent with a client could lead to problems

with high turnover rates and decreased quality of care (35). Issel went on to say that the organizational mission statement and the stakeholders taking ownership in the quality of the program indicated better care for the client (35).

The use of home-based breastfeeding programs was examined to determine the efficacy versus, or in addition to, in-hospital care (36). Prior to the study, Stevens had determined through research that home-based programs for breastfeeding harbored elevated maternal satisfaction as well as increased duration of breastfeeding (36). After analyzing the cost difference inherent in home-based programs, it was found that among births that went full term they were comparable in price with those held in the hospital setting for standard postnatal care based on the difference between lactation consultation home-visit cost off-set by less time and expense traveling and away from jobs/work (36).

Marketing

In establishing a facility to provide services during pregnancy and care for the newborn, the World Health Organization developed 10 steps associated with successful breastfeeding (See Appendix B). The steps must be instituted by having solid policies, good communication, and a knowledgeable staff ready and willing to provide help and support whenever possible (37).

The field of dietetics has rapidly grown and expanded its arena of services; therefore, the importance of a business plan was documented in the Journal of the American Dietetic Association (38). The steps to producing a finished business plan were outlined as follows: "organizing process, SWOT analysis, goal setting, operating plans, financial plans, and written business plan (38)." The market strategy of the business plan was defined as determining what would be sold and who would be the consumer based upon research of the current market, competition, and how the new business would standout to the consumer (38). This article

indicated several key points such as “how to develop a client base, what will be charged, and how will the business be paid (38)?” The actual business plan itself, once finished, was an excellent tool that outlined everything the entrepreneur has considered, and it could be used to show the potential stakeholders the commitment and detailed workings of how the business was to be established (38). In addition to a marketing tool to sell the program/business to others, the business plan could be used internally to design a framework outlining how the staff and employees would contribute in the day-to-day operations. This would contribute to the goals and objectives of the company as the stakeholders would know where the strengths and weaknesses were located and how to fine-tune the operation as a whole (38).

In 2004 three dietetics professionals explained their knowledge of positioning and promoting themselves as nutrition experts to other healthcare providers (39). All three of the professionals agreed that understanding the customers’ needs and exceeding their expectations was the key to a successful nutrition care program (39). In most cases for-profit businesses must make a profit to survive; because medical nutrition therapy can only be billed to insurances for specific diagnoses, the pricing must be competitive and the services must stand apart from their competitors (38). In order to establish a good reputation for the new business, there were ways identified to communicate to other professionals who have a stake in the potential company (38). Biesemeier commented that the main goal was to leave a lasting impression with physicians or administrators who may or may not choose to support the company efforts through referrals or by funding (39). Biesemeier outlined the crucial elements as follows “ establishing credibility through evidence-based practice, building ongoing relationships, taking initiative, meeting their needs, not burning bridges, and always being there when needed (39).” Another registered dietitian interviewed in the study, Sandra Luthringer, offered the advice of “specializing in a

particular area and becoming an expert in that area and getting involved (39)." Biesmeier commented again that the reasonable short-and long-term goals were to "improve recognition and self-marketing by focusing on providing a new and enhanced program or service for patients or clients" to set the service apart from the already existing businesses (39). Luthringer again commented that the best way to establish oneself in a professional setting was by finding "opportunities to market your clinical experience; the business will ultimately benefit if you are a self-starter and one who is willing to take the leap (39)."

CHAPTER 3

DESIGN AND METHODOLOGY

Procedures

No empirical data research was conducted through this study; therefore, the use of secondary data sets were the best way to gather information and make analyses based on reliable references. Also, as the researcher was a native of the Tidewater region in Virginia, an understanding of the localities and personal observations was used in choosing the prospective locations for study.

In order to determine the feasibility of a prenatal and postnatal nutrition and lactation consulting facility, a review of the demographics, target population, surrounding facilities, and resources available was conducted on each of two cities in the Tidewater region of Virginia, both Virginia Beach and Williamsburg. An online search engine, Google, was used to obtain the most recent information on each city to help build a character sketch of each locality. Using the most recent data collected from the United States Census Bureau on both cities, the overall demographics were reviewed and the key statistics that would be related to a facility being feasible in that area were examined; those were total population, education level, income levels, race/ethnic distribution, marital status of families, and age distribution. The cities' local hospitals and other resources available in the prenatal and postnatal setting for both nutrition and lactation were investigated to determine potential competition for this undertaking. Information was also obtained from the Virginia Department of Health about birth and breastfeeding rates. Local birth rates and demographics of the mothers were searched for as well for Virginia Beach and Williamsburg.

Analysis

Once the data were obtained and summarized, a comparison between the two cities was made to determine which city would be the most feasible for a prenatal and postnatal nutrition and lactation consulting facility and would be most well accepted by the people of that area. A side-by-side comparison of the U.S. Census Bureau demographics was made to evaluate the logistics of setting up the nutrition and lactation facility for the target audience. Once all of the comparisons were made, the city of best location was determined and a SWOT (Strengths, Weaknesses, Opportunities, & Threats) Analysis was conducted to determine areas that would allow such a facility to succeed as well as identified obstacles the program may have to overcome.

CHAPTER 4

RESULTS

Demographics

The objectives of this study were to investigate the efficacy of prenatal and postnatal nutrition and lactation consulting by health professionals by determining their place and effectiveness in the private outpatient setting, to establish the most effective location, and to determine the feasibility of providing these services. Therefore, the following data were compiled from the U.S. Census Bureau's 2000 Census and the Virginia Department of Health for both cities, Virginia Beach and Williamsburg, Virginia. A comparison of the same characteristics in each of the two cities was done to establish a sketch of the populations in each city (See Tables 1 and 2). The characteristics reviewed were chosen for examination based on the review of literature for the potential target population for a prenatal and postnatal nutrition and lactation consulting facility. In Table 3, the overall breastfeeding rates were observed for the state of Virginia in 2005 as compared to the goals set for breastfeeding according to Healthy People 2010.

Table 1: Virginia Beach (city), VA Demographics

	Virginia Beach (City)
Population, (2005) estimate	*438,415
Female percent (2004)	*50.6%
Median age (years)	**32.7
Percentage of population 18 years or older	**72.5
Percentage of population 65 years or older	**8.4
White persons (2004)	*71.5%
Black persons (2004)	*19.9%
Asian persons (2004)	*5.4%
Hispanic/Latino origin (2004)	*4.8%
High School graduate, persons age 25+	*90.4%
Bachelor's degree or higher, persons age 25+	*28.1%
Median household income (2003)	*$50,257
Persons below poverty (2003)	*8.0%
Population 15 years and older Never Married	**25.5%
Population 15 years and older Now Married	**57.1%
Married Couple families (children under 18 years)	**55.7%
Female Household (no husband present, children under 18 years)	**12.4%
Owner-occupied housing units	**65.6%
Renter-occupied housing units	**34.4%
Total Live Births	***6,665
Birth Rate/1,000 Estimated Population	***15.1
Total Teenage Pregnancies (19 or younger)	***921
Began Care in First 13 Weeks	***5,922

*(40)
**(41)
***(42)

Table 2: Williamsburg (city), VA Demographics

	Williamsburg (City)
Population, (2005) estimate	*11,751
Female percent (2004)	*55.4%
Median age (years)	**22.6
Percentage of population 18 years or older	**90.4
Percentage of population 65 years or older	**11.7
White persons (2004)	*81.9%
Black persons (2004)	*12.2%
Asian persons (2004)	*4.7%
Hispanic/Latino origin (2004)	*2.8%
High School graduate, persons age 25+	*89.6%
Bachelor's degree or higher, persons age 25+	*45%
Median household income (2003)	*$34,495
Persons below poverty (2003)	*17.5%
Population 15 years and older Never Married	**30.3%
Population 15 years and older Now Married	**54.1%
Married Couple families (children under 18 years)	**37.2%
Female Household (no husband present, children under 18 years)	**9.6%
Owner-occupied housing units	**44.3%
Renter-occupied housing units	**55.7%
Total Live Births	***172
Birth Rate/1,000 Estimated Population	***15.0
Total Teenage Pregnancies	***40
Began Care in First 13 weeks	***153

*(43)
** (44)
*** (45)

Table 3: State of Virginia Breastfeeding Rates, 2005
(Percent +/- half 95% Confidence Interval) (46)

	Ever Breastfeeding	Breastfeeding at 6 Months	Breastfeeding at 12 Months	Exclusive Breastfeeding at 3 Months	Exclusive Breastfeeding at 6 Months
Virginia	69.4±6.1	39.0±5.7	20.9±4.5	38.8±5.7	14.1±3.6

Competition

To review the competition in the Williamsburg and Virginia Beach cities of Virginia, a web-based search was done to investigate the potential threats of pre-existing services of similar caliber to the potential prenatal and postnatal nutrition and lactation facility. The hospital systems in the area were identified as Riverside, Sentara, and Bon Secours (47,48,49). A list of the hospitals in these major hospital systems, all of which provided some prenatal services such as Lamaze, nutrition, breastfeeding, support groups, etc. appears below.

Hospitals near Williamsburg, VA
Mary Immaculate Hospital (Bon Secours)
Bon Secours Maryview Medical Center
Riverside Regional Medical Center
Riverside Walter Reed Hospital
Sentara Williamsburg Regional Medical Center
Sentara Careplex Hospital

Hospitals near Virginia Beach, VA
Bon Secours Heath Center in Virginia Beach
Depaul Medical Center (Bon Secours)
Sentara Bayside Hospital
Sentara Virginia Beach General Hospital
Sentara Norfolk General
Sentara Leigh Hospital

SWOT Analysis

In analyzing the areas in which a prenatal and postnatal nutrition and lactation consulting facility/service would be able to succeed and areas of potential shortcomings, a SWOT analysis was conducted based on the review of literature, demographics, and competition in the area (50). This tool was used to organize and simplify the internal and external environments surrounding the potential facility to better examine the benefits and challenges the facility may face. The strengths were developed to examine where the facility would stand out among competitors, whereas the weaknesses were obstacles that the facility/staff may face within its own entity. The opportunities were projected to be areas of potential growth in the business/healthcare community, yet the threats were identified as potential complications beyond the facility's scope of predicting. All aspects of the SWOT analysis were carefully analyzed for the purpose of identifying strong points as well as areas identified as needing improvement both inside and outside of the company (50).

SWOT Analysis:

Strengths:

- One-stop spot to get information about nutrition and lactation, before and after pregnancy
- Supportive and caring professional staff in a private setting
- Support groups with other mothers in a comforting setting
- Individual and group education counseling sessions
- On-call LC's for the mother to use and at-home visits
- Already comfortable, familiar with, and knowledgeable about breastfeeding with the LC, not a stranger in the hospital
- Mothers of first-time pregnancies will be targeted as to orienting mothers to pregnancy
- Most LC's in the community are either nurses or physicians, few with nutritional background such as RD's
- Start-up costs could be lower if the RD was licensed as an LC
- RD would be able to foster weight gain in the appropriate amounts during pregnancy to prevent post-partum weight retention and complications related to obesity during and after pregnancy

Weaknesses:

- Limited staff
- Difficulty getting started without previous reputation and client base
- Need to improve relationship with physicians
- Will take a lot of leg-work and marketing to establish a client base and good reputation
- Most women only need these kinds of counseling once in a lifetime and not necessarily for their next pregnancies

Opportunities:

- Reach out over the region, expand facility
- Good relationship with physicians for more referrals
- Incorporate/provide other services
- Rising rates of breastfeeding
- For insurance companies to cover these services

Threats:

- Competition (other facilities/resources in the area)
- Economic downturn
- Obsolete technology

CHAPTER 5

DISCUSSION, CONCLUSION, AND RECOMMENDATIONS

Discussion

Based on the review of literature and the repeated results found on the type of women who were more likely to take advantage of services provided by a prenatal and postnatal nutrition and lactation consulting facility, the target market was established. The ideal candidate to use the services and education provided by dietitians and lactation consultants would most likely be women experiencing a first pregnancy due to the uncertainty of what to expect during pregnancy and the desire to learn as much as possible to ensure a healthy baby. Women who have higher educational backgrounds and who were of higher socioeconomic status were the women who appeared to be more knowledgeable about the effects of diet and nutrition and how the results of her actions would affect the outcome of pregnancy (28, 29, Appendix C). Women who were married with good emotional support were also included in the target population as the family was the goal of pregnancy, and with a good support team the woman was encouraged to make healthy decisions (29, Appendix C).

The comparison of the two cities, Virginia Beach and Williamsburg, looked at the overall population, the percentage of women of the population, the educational background, the median income per household, population distribution based on race, the age distribution of the population, and marital status. It appeared that Virginia Beach has a total population was almost 40 times greater than that of Williamsburg based on the actual city residents, not county residents. However, Williamsburg had a larger percentage of the population who were women 55.6% than the percentage of women residing in Virginia Beach 50.6%. There was an almost $15,000 difference in median household income for families in Virginia Beach at $50,257 versus

that of Williamsburg at $34,495. In Virginia Beach there were more families with heads of the household who were married versus unmarried. In Virginia Beach there were 57.1% of households with married couples and 55.4% of households with married couples and children under the age of 18. In Williamsburg these numbers were slightly lower with 54.1% of households with married couples and only 37.2% of those households with married couples having children under the age of 18. Virginia Beach appeared to be the more stable city with 65.6% of homes being owned and only 34.4% being rented by the tenants, whereas in Williamsburg 44.3% of homes were owner-occupied and 55.7% of homes being rented by its tenants. In reference to the age of the populations of the two cities, Williamsburg had a larger percentage of residents over 65 years of age at 11.7% and 90.4% of the total population at 18 years or older; however, the median age is 22.6 years old which indicated a large proportion of people in their early 20s. Virginia Beach on the other hand had less people over the age of 65 with only 8.4% of the population over 65 years of age and 72.5% of the population 18 years old or older; however, the median age was in the early-thirties at 32.7 years of age. The total number of live births in Virginia Beach was much higher at 6,665 opposed to the only 172 live births in Williamsburg and of those births 13.8% were to women 19 years and younger in Virginia Beach as opposed to 23.3% in Williamsburg. Statistics taken from the Virginia Beach March of Dimes website indicated that of the women receiving early prenatal care (during the first trimester), those in the ages of 30-39 and 40 and older were most likely to receive care, closely followed by the percentage of women in their 20s receiving early care (51). The women 20 years old and younger had the lowest percentage of mothers receiving early prenatal care (51).

The national demographics of the women who were giving birth and breastfeeding children were seen and conclusions were made based on trends in the report by the 2005 National Immunization Survey, Centers for Disease Control and Prevention, Department of Health and Human Services (See Appendix C). There were 18% more married women who chose to breastfeed as opposed to those who were unmarried. There was a trend that showed as education level increased, so did the likelihood of breastfeeding. The older the mother was during childbirth the increased chance of her breastfeeding. It appeared that the first child was not the most likely to have been breastfed, the consecutives births for a mother were more likely have been breastfed. The mother may have been more confident or relaxed with the second and third children as opposed to stressed and frustrated with breastfeeding the first child. Nationally, Asian women appeared to be the most likely to breastfeed over other races/ethnicities according to the data. However, it appeared that women who received WIC and those ineligible for WIC were equally likely to breastfeed, although those who did not meet the WIC requirements appeared to sustain breastfeeding for longer periods than those receiving WIC assistance. Overall for the past 30 years according to the Ross Products Breastfeeding Trends in 2002, the rate of breastfeeding has increased both in the hospital and six months post-partum (Appendix D). There were no specific breastfeeding rates obtained on each city pertaining to breastfeeding however, as a whole the state of Virginia has yet to meet the goals set for Healthy People 2010 (46).

Based on the Annie E. Casey Foundation Trends in Key Indicators from 1990-2003 for the city of Virginia Beach it appeared that compared to a 50-City Average, Virginia Beach had a lower total percentage of mothers giving birth who are unmarried at 27.7% compared to 44.3% (52). Virginia Beach also had a higher percentage of women who had educations of at least 12

years which had improved over this 13-year period to 91.8% compared to the 50-City Average of 72.4% (52). However, the number of total births has decreased over this time period of 13 years from 7,663 to 6,375, a difference of almost 1,300 fewer births (52).

In looking at some of the competition across the region in both cities, it appeared that the main hospital systems did provide low-cost or free seminars relating to childbirth and breastfeeding (47,48,49). These courses were most often provided by the employees of the hospital system and offered a variety of services such as Lamaze, paternal, nutrition, exercise, parenting, and other classes in which women and families could participate in. The local hospital systems of the region were Riverside, Sentara, and Bon Secours all of which offered locations throughout the region (47,48,49). However, in looking at the list of lactation consultants in the region, it was observed that very few if any lactation consultants were registered dietitians (53). Most of the lactation consultants were either nurses or physicians all of whom are qualified, yet did not have the experience and knowledge that a registered dietitian had in the area of nutrition and behavior change strategies (53).

The International Board of Lactation Consultants requires a candidate interested in achieving breastfeeding expertise to be knowledgeable in all areas relating to breastfeeding and pass a certifying examination. The qualifications that must be met to sit for the exam were college courses such as anatomy, physiology, sociology, psychology/counseling, child development, and nutrition. There was a comprehensive lactation management course that was mandatory within three years of sitting for the certification examination. One must have achieved hands-on experience to be sure the proper techniques and evidence-based methods were followed. Once these have been completed, one may be eligible to request the examination. As

a licensed lactation consultant, one must keep current on breastfeeding education, meet the continuing education requirements, and stay active in the profession.

The SWOT analysis was conducted to target the areas in which a prenatal and postnatal nutrition and lactation consulting facility would be able to prosper and where there may be areas of struggle. The strengths identified were based on ways such a facility could overcome competition and stand out in a community in order to succeed. As a one-stop shop for all prenatal and postnatal information on breastfeeding and adequate nutrition, this facility would be able to adapt to the ever-changing challenges of the economic community with the potential for success and expanding services across the region.

Conclusion

In reviewing the literature on the effectiveness of prenatal nutrition counseling by a registered dietitian, it appeared that positive feedback has been established about adequate weight gain during pregnancy (3,10,14,15,17). It has emerged that the standard prenatal care has been lacking in the area of nutrition education and guidance that a registered dietitian could address to promote good health for both the mother and infant (17). It remained that each pregnancy is a different case, and each mother needs individualized nutritional advice.

As with nutrition education prior to delivery, breastfeeding education early on during pregnancy has been noted to improve the duration and intensity of breastfeeding (24,25). Although there were barriers and influences that may discourage women from breastfeeding, meeting with a lactation consultant before delivery may answer questions and ease the hesitations to this method of feeding, as it has proven to have benefits to both mother and baby (26,27).

In looking at the two cities, Virginia Beach and Williamsburg, I concluded that Virginia Beach would be the first choice for location of a prenatal and postnatal nutrition and lactation facility based on its overall larger population, greater number of live births, and higher income. The local hospitals in both cities did however offer several of the services mentioned in this proposed prenatal and postnatal nutrition and lactation consulting facility. However, there were things that could make a private facility stand out and would differentiate it from those services already in existence. One way this facility would stand out among competitors would be the fact that each mother would receive individualized care through one-on-one counseling with the RD and LC as well as group sessions to foster healthy relationships in a comfortable environment. The fact that the RD is the nutrition expert and would also be a licensed lactation consultant means she would be the expert in nutrition for both mother and baby and able to answer related questions.

Recommendations

Based on the literature and the overall conclusions found in this study, the next step in initiating the potential prenatal and postnatal nutrition and lactation consulting facility would be to conduct interviews with local physicians (obstetricians, pediatricians, etc.), lactation consultants, registered dietitians, and nurses who work in the field of labor and delivery as well as pediatrics. This would allow the researcher to collect data in support or resistance to this type of facility. An anonymous survey given to pregnant women to determine their interest and desires during this time of life would help pinpoint goals and services provided by such a facility.

Another important step to take next would be the financial side of the business to determine if it would be better to start a small business to stand on its own or to meet with administrators of local healthcare facilities to incorporate this type of service into an already existing healthcare system. Some of the advantages of being affiliated with a pre-existing healthcare system would be start up money, brand recognition in the local community, and physicians who were already affiliated with the goals and objectives of the system of healthcare.

The services and skills of a registered dietitian as a nutrition counselor and as a lactation consultant appear to be a great combination; additionally there are other services that the company could incorporate and be able to grow and expand. The more services available at one place the less customers would have to travel to different facilities to meet all of their needs. If the facility was a one-stop-shop, it could expand to incorporate such services as Lamaze classes, parenting seminars, mom and baby aerobics/exercise courses, paternal education on what to do when the baby arrives, as well as support groups set up for women who are in the same stage in their pregnancy or sharing experiences with breastfeeding. This facility could potentially meet many of the needs of mothers and infants as they grow and learn together.

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APPENDICES

APPENDIX A

Institute of Medicine Recommendations for Maternal Weight Gain based on Body Mass Index

Weight category	**BMI value**	**Recommended amount of weight gain in pregnancy**	**Recommended rate of weight gain for 2nd and 3rd trimester**
Underweight	< 19.8	28 to 40 pounds	Slightly more than 1 pound/week
Normal	19.8 to 26.0	25 to 35 pounds	1 pound/week
Overweight	>26.0 to 29.0	15 to 25 pounds	2/3 pound/week
Obese	>29.0	15 pounds	Aim for a steady rate of gain
Twins	Regardless of BMI category	At least 35 to 45 pounds	1.5 pounds per week

APPENDIX B

World Health Organization: The Ten Steps to Successful Breastfeeding

Every facility providing maternity services and care for newborn infants should:

1. Provide a written breastfeeding policy that is routinely communicated to all health care staff.

2. Train all health care staff in skills necessary to implement this policy.

3. Inform all pregnant women about the benefits and management of breastfeeding.

4. Help mothers initiate breastfeeding within a half-hour of birth.

5. Show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants.

6. Give newborn infants no food or drink other than breastmilk, unless *medically* indicated.

7. Practice rooming-in – allow mothers and infants to remain together – 24 hours a day.

8. Encourage breastfeeding on demand.

9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.

10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

APPENDIX C

Breastfeeding Rates by Socio-demographic Factors, 2005 (54)

Breastfeeding Rates by Socio-demographic Factors, 2005
(Percent ± half 95% Confidence Interval)

Socio-demographic Factors	Number	Ever Breastfeeding	Breastfeeding at 6 months	Breastfeeding at 12 months	Exclusive Breastfeeding[1] at 3 months	Exclusive Breastfeeding[1] at 6 months
US National	27423	72.9±0.9	39.1±0.9	20.1±0.8	38.7±1.0	13.9±0.7
Sex						
Male	14054	72.7±1.2	38.7±1.3	19.6±1.1	38.2±1.3	13.6±0.9
Female	13369	73.2±1.2	39.5±1.3	20.5±1.1	39.3±1.4	14.2±0.9
Race/ethnicity						
American Indian or Alaska	904	67.3±5.5	33.7±5.1	16.7±4.0	30.7±5.1	11.3±2.9
Asian or Pacific islander	1724	81.4±2.9	47.5±3.9	24.5±3.2	43.1±3.9	18.1±2.9
Asian	1432	81.9±3.1	47.1±4.2	24.2±3.4	43.2±4.2	18.5±3.2
Native Hawaiian and other	365	78.5±6.9	51.2±8.8	28.0±8.4	43.0±8.8	17.5±7.5
Black or African American	4921	59.6±2.3	27.1±2.1	13.5±1.7	29.7±2.2	10.0±1.4
White	21409	75.7±1.0	41.5±1.1	21.5±0.9	40.9±1.1	14.6±0.8
Hispanic or Latino	5832	79.0±1.7	42.0±2.1	22.0±1.8	43.9±2.2	14.1±1.5
Not Hispanic or Latino	21591	70.7±1.0	38.0±1.0	19.3±0.8	36.8±1.0	13.8±0.7
Black or African American (non-Hispanic)	4062	55.4±2.5	24.8±2.2	11.9±1.8	26.8±2.3	9.2±1.5
White (non-Hispanic)	16749	74.1±1.1	41.1±1.2	21.0±1.0	39.3±1.2	14.7±0.8
Birth Order						
First Born	12854	74.0±1.3	36.6±1.4	17.7±1.1	36.4±1.4	12.3±0.9

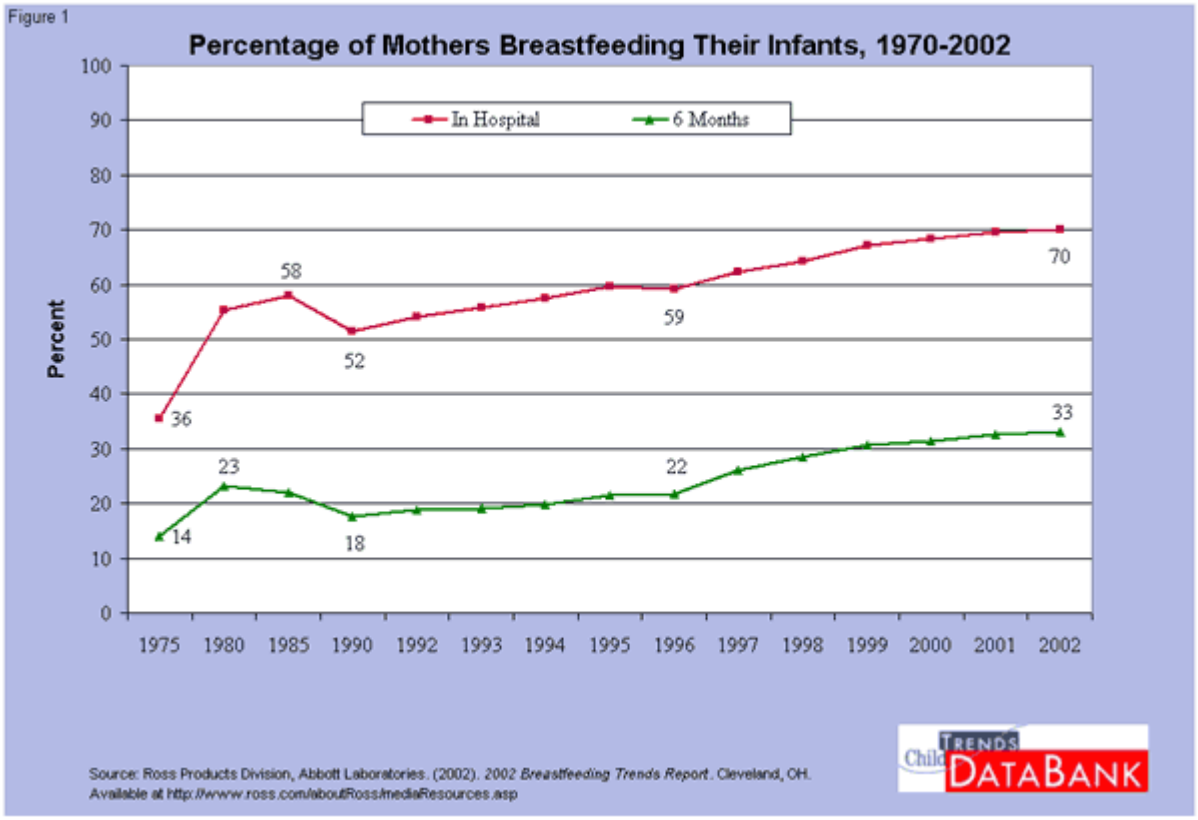
Not First Born	14569	72.1±1.2	41.2±1.3	22.1±1.1	40.7±1.3	15.2±1.0
Receiving WIC[2]						
Received WIC	12296	65.8±1.4	30.3±1.4	15.7±1.1	31.7±1.4	10.5±0.9
No WIC but eligible	1358	77.6±3.4	48.6±4.2	28.5±3.7	49.1±4.2	20.4±3.4
No WIC and ineligible	12457	81.9±1.1	49.2±1.4	24.5±1.2	46.4±1.4	17.3±1.0
Maternal Age, Year						
Mom age<20	589	50.0±6.5	14.8±4.4	5.4±2.3	17.5±4.7	6.7±3.0
20<=Mom age<=29	10689	68.4±1.4	31.7±1.4	15.8±1.2	32.8±1.5	10.1±0.9
Mom age>=30	16145	77.7±1.1	46.2±1.3	24.2±1.1	44.6±1.3	17.3±1.0
Maternal Education						
<High School	3110	63.6±2.6	32.2±2.7	17.9±2.3	33.6±2.7	12.3±1.9
High School	6755	64.8±1.8	29.3±1.7	14.9±1.4	30.6±1.8	10.2±1.2
Some College	4618	76.8±1.9	39.3±2.3	19.5±2.0	39.5±2.3	13.3±1.5
College Graduate	12940	84.5±0.9	52.5±1.3	26.6±1.2	49.3±1.3	18.6±1.0
Maternal Marital Status						
Married	20258	78.4±0.9	45.2±1.1	23.7±1.0	43.7±1.1	16.1±0.8
Unmarried	7165	60.3±1.9	25.0±1.7	11.6±1.3	27.2±1.8	8.8±1.1
Residence						
MSA, Central City	12968	74.2±1.3	41.0±1.5	21.9±1.3	40.2±1.5	15.1±1.0
MSA, Non-Central City	9615	74.8±1.4	40.7±1.5	20.2±1.3	40.3±1.6	13.9±1.1
Non-MSA	4840	64.9±2.1	30.0±1.9	14.8±1.4	30.6±1.9	10.8±1.3
Poverty Income Ratio[5], %						
Pov-Inc Ratio <100%	4610	63.5±2.3	29.7±2.2	16.7±1.9	31.7±2.3	10.7±1.4
100%<=Pov-Inc Ratio<185%	4512	70.8±2.1	35.4±2.3	18.7±1.9	36.7±2.4	13.0±1.8
185%<=Pov-Inc Ratio <350%	6159	73.6±1.9	41.0±2.0	20.3±1.6	38.9±2.0	14.2±1.4
350%<=Pov-Inc Ratio	8987	82.4±1.2	48.3±1.6	23.5±1.4	46.0±1.6	17.0±1.2

[1]Exclusive breastfeeding is defined in this 2005 study as ONLY breast milk — NO solids, no water, and no other liquids. NOTE: This new definition is a diversion from the 2003 NIS data, which had defined exclusive breastfeeding as "only breast milk and water -- no solids or other liquids."
[2]WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.
[3]Unmarried includes never married, widowed, separated, divorced.
[4]MSA = Metropolitan Statistical Area defined by the Census Bureau.
[5]Poverty Income Ratio = Ratio of self-reported family income to the federal poverty threshold value depending on the number of people in the household.
Source: 2005 National Immunization Survey, Centers for Disease Control and Prevention, Department of Health and Human Services

Sample sizes appearing in the 2005 NIS breastfeeding tables are slightly smaller than the numbers published in other NIS publications due to the fact that in the DNPA breastfeeding analyses, the sample was limited to records with valid reponses to the breastfeeding questions.

APPENDIX D

Percentage of Mothers Breastfeeding Their Infants, 1970-2002 (55)



VITA

MARISSA BLAKE BEALE

Personal Data:	Country of Origin: United States of America
	Place of Birth: Suffolk, Virginia
	Marital Status: Engaged to Christopher S. Spady
Education:	High School: Windsor High School, Windsor, Virginia
	Undergraduate: James Madison University, Harrisonburg, Virginia; Bachelor of Science in Dietetics 2005
	Dietetic Internship: East Tennessee State University, Johnson City, Tennessee; Completed 2006
	Graduate: East Tennessee State University, Johnson City, Tennessee; Masters of Science in Clinical Nutrition, 2007
Professional Experience:	Hallmark Health Services, Registered Dietitian, Johnson City, Tennessee, October 2006 – May 2007
	Graduate Assistant, East Tennessee State University, Dept. of Family and Consumer Sciences 2005-2007
Honors and Awards:	Omicron Delta Kappa, James Madison University
	National Society of Collegiate Scholars
	Alpha Phi Omega, Service Fraternity, James Madison University